

# 2007 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY CONDITION REPORT

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## REVIEWERS AND AFFILIATIONS

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## REVIEWER COMMENTS (IN NO PARTICULAR ORDER)

### Review 1 of 4:

#### Comments for posting on the website:

This report is to my knowledge an accurate assessment of the condition of the Flower Garden Banks National Marine Sanctuary. The content is objective and dispassionate, which is refreshing. My only concern is a subtle downplaying of the potential future role of climate change (p. 6, item 13) and its characterization as a natural process (p. 4). On the latter point, the preponderance of evidence clearly demonstrates that climate change is overwhelmingly a human-induced phenomenon. On the former, the text of the report is more in line with scientific expectation than is the table on page 6. As water temperatures rise, we should expect an increased incidence of bleaching and a greater incidence and virulence of infectious diseases (this especially because of the high density of coral colonies, and notwithstanding the fact that disease outbreaks do not always occur in the summer). Minor adjustment of the text is really all that is necessary.

#### The following editorial comments are intended for those who prepared the report. They are not intended for posting as public comments:

page 9, bottom and following: use metric units, or both British and metric. Page 12 uses metric only.

page 10, top: identify the missing branching corals as acroporids.

page 20, top paragraph, "golden morphology": golden is a color, not a morphology. I would suggest "golden morph" or "golden form."

page 29, last line: “forces” should be changed to “forced.”

page 34: the figure on this page comes from a PBS&J report. Although the sources of the data are noted in the caption, the caption should contain appropriate attribution, such as “Modified from XXX.” Also, there is no way to know the date of the surveys represented by the second set of bars from the left.

Acknowledgements: I am at the Dauphin Island Sea Lab, not the University of South Alabama.

**Review 2 of 4:**

**FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY  
CONDITION REPORT**

Section	Page	Line #	Comment/Suggested Revision	Reviewer Initials
General			<p>Overall, the report was fairly comprehensive and has a good background and introduction. This is necessary to understand the impacting sources in other parts of the document. Some of my comments will be related to consistency and accuracy of this information, as is warranted by the goals of using the “best information available” and “best available science” in these endeavors.</p> <p>There is a common and excessive use of “waffle” terms particularly towards the document. There are always times when there is little or no certainty in some aspect of describing the environment, but using conditional words when not necessary is not a good idea. If conditions warrant a simple statement of something being good, bad, better or worse, just say so, don’t say appearing to be, or may be, or appear to be relatively, etc.</p> <p>Font size of 10 point was pretty small in general. Perhaps final version will be more readable.</p> <p>Assuming all figures will eventually get captions; e.g., some very interesting deep shots on page 17 and 18 with no info.</p>	GSB and all following
Abstract	4	Bottom paragraph	Large groups of marbled grouper were common during the 1970’s during the first monitoring activities. Groups of 4-6 were typical on the <i>madracis</i> -algal ridges of the EFG. perhaps the sentence should read “marbled	

			grouper, is known to be rare in most of its range, but has recently been <b>rediscovered</b> to be common in certain habitats at the Flower Gardens.	
Condition Summary Table	5	Habitat #6	Comment under basis for judgment is true: oil and gas exploration hardware has been found on banks, some has been removed over the years. However, following box on description of findings would imply that this debris has “precluded full development of living resource.” I do not believe this is the case, at least not for the limited amount of very old hardware. Seismic cable and even transducers are heavily covered in colonies of healthy coral. Tremendous growth covers most all of these older cables preventing removal without destruction of significant coral area. There is no evidence of any preclusion of resource development due to the presence of stable hard substrate. If fishing line or fishing related materials is implied, that should be clearly stated.	
Condition Summary Table	6	Living Res. #13	There is a declaration of declining condition based on limited observations of bleaching and disease. Some additional explanation is warranted here. If this report is a summary of the past 5 years and is to serve for an additional 5 years, the very limited observations of increased bleaching and disease do not seem to justify a down arrow, at least without some caveats. The increased numbers of observations of disease are limited in number and only from the last year or two (with some increased observational effort involved as well). Live coral cover remains the best in this hemisphere. That does not sound like declining conditions; sounds like conditions generally do not appear to be changing with some areas of concern.	
About..	7	Figure caption	This is the first of a long string of inconsistent depth ranges for the FGB. The real number is a little elusive, but it should at least be the same number throughout this document and on the web site. The FGB web page says the shallowest point is 55 ft or 17 m. Stick with that number. This figure says 54 ft, many other versions later.	
Overview	9	top	This one has the right number; 55 ft.	
Discovery	9	3 <sup>rd</sup> P	“No activity Zones” around many of the banks should read around <b>most all</b> of the banks. MMS has NAZs around all but a very few major features, certainly more than just “many.” Total of 37 banks. Every named feature except Sebree and maybe one other.	
East and West	9	2 <sup>nd</sup> P	Change 54 ft to 55 ft.	

	10	top	Should update now that there are documented colonies of <i>A. palmata</i> at both EFG and WFG. Could also mention black coral being found on the reef cap (Boland and Sammarco 2005).	
Stetson Bank	10	intro	Would be consistent to describe depth range of this Sanctuary as well.	
Currents	11		This sections is a generic “story” with little or no fundamental science backing up any of the implied points. This same theme started with the 2003 <i>Islands in the Stream</i> NOAA OE expedition and more recently as an un-authored NOAA document promoting a huge Gulf-wide national Monument system based on the same theme of “islands in the stream” and “jewels on a string.” There has been no published data of any kind supporting the regular reliance of northern GOM habitats on input of larvae of any kind from Mexico or Caribbean sources. The general idea is seriously flawed in perceptions of where loop-current eddies actually travel to and how long the transit times are. Even theoretical colonization of northern Gulf habitats thousands of years in the past have no real validity in assertions of obligate biological connectivity. Simple observations of the same species in widely separated locations does not prove connectivity. In fact, the opposite has often been found to be the case such as in reef fish populations of the Caribbean and regionally isolated <i>Acropora</i> coral (Baums et al 2005). Should be very careful about keeping this speculative material implied to be best science. This is assuming there have been no recent peer-reviewed publications on the genetic affinities and very low genetic diversity (implying connection) between the northern Gulf and other locations. A speculation about connectivity in the distant past is one thing, but implying regular and short-time scale connectivity is undocumented.	
Connectivity	12		Similar issues of undocumented and purely hypothetical connections due to simple geological features. The speculation that geological features that “may allow” much more direct interaction, is only speculation. Water depths and water quality are extraordinarily different from the tops of banks and the areas between them, regardless of geological features present. Temperature, turbidity and many other factors act as barriers to recruitment and transport of most all species located on the crests of the Sanctuary banks. Connectivity cannot be implied from simple connect-the-dots features in much different environmental conditions.  The case of platforms is much different and well	

			documented. Platforms present viable hard substrate from the bottom to the surface at every location, therefore the successful expansion of species such as sergeant majors, tessellated blennies and <i>Tubastrea</i> .	
Habitat	12	4 <sup>th</sup> bullet	Would be nice to define coral here (all types, not just stony as many of public would assume)	
	14	P 1,2,3	Water depths now all in meters??? Coral reef now 18 m instead of 17 if keep meters. Maybe pick one unit and change all to be the same?	
	16		Not sure of image layout in final, but the picture on the top of the page is from Stetson and is in FGB description section.	
Soft bottom	18		I think a note is needed for <i>Cirrihipathes</i> . This is not really a soft-bottom taxa. Sedimentation had to have covered the original substrate. It cannot settle and grow without at least a small piece of hard bottom, it is not expected in a soft bottom area.	
Sharks and Rays	21	P 1	Would modify "Nurse sharks are <i>sometimes</i> seen.."  Really very rare. Maybe seen one in 550 FGB dives. Others are reported on occasion but not really "often."	
Aquaculture	23		A little detail is needed here. Just saying AR and aquaculture is a cause of concern is not appropriate for this document that is supposed to be founded in best science. What are the concerns elsewhere that could possibly impact the FGB from some great distance? How could artificial reefs impact the FGB. This is also the place to bring up introduced species impacts ( <i>Tubastrea</i> ). Give examples from literature and cruise reports, not just a sigh of concern.	
Climate change	23		Drop the word "reefs." <i>Corals typically respond to elevated seawater temperatures</i> . Reefs don't bleach, the corals do.	
Climate change	23		Worth mentioning the ongoing effort to monitor deep reefs at EFG that will be more isolated from climate change and enable better management decisionmaking.	
Coral Disease	23		Dramatic statement about "some evidence" for coral's immune system impacts. To support the science background of this document, a reference is definitely needed here. Again, care needs to be taken if the evidence is just speculation or extrapolation from somewhere else. Best science must have references.	
Coral Disease	23	bottom	This is interesting, but again, a completely unproven hypothesis as stated. The only evidence is from experiments of dipping wet suits into bacterial cultures having nothing to do with a diver swimming by a diseased coral head. This article took off on the internet with a life of its own, "Divers killing reefs" "Divers spreading disease on their wetsuits" with	

			absolutely no evidence of any kind. Interesting, Kay Briggs used to work for MMS. I spoke to her about this. It is an interesting line of research, but a very long way from reality at this stage. This kind of speculation does not really belong here in my opinion.	
Unprotected	24		Plural patch reefs	
By-catch	25		The mention of safety concerns from by-catch is so minimal it is really not worth mentioning. We dive with hundreds of sharks in open water at Walker's Cay and they are intentionally chummed into the area and never an accident. Barracuda have never been attracted to divers jumping in I have ever seen or heard of. Nobody fishes off charter dive boats anyway. A stretch.	
Aging infrastructure	27		Most likely this would be a cutoff at 27 m. Very rare to be shallower and requires lighted buoys.	
LNG	28		There is already an operating LNG offloading site using the open loop process in the Gulf. The Gulf Gateway Energy Bridge deepwater port off Texas has been operational since March 2005. It is owned by Exceleerate Energy located in Block 603 of the West Cameron Area	
Visitor use	28		Number of passengers is now incorrect for M/V <i>Spree</i> . Not sure of total now, but closer to 20, not 34	
	29		Same issue with bacteria experiments on dive gear. Skipped the critical factor of divers on a coral reef actually getting bacteria on dive gear. Reference is to a non-peer reviewed internet site, Nature News, not the original work. Other internet articles also titled with unsubstantiated claims: "Divers carry pathogens in their wetsuits" <a href="http://www.bioedonline.org/news/news.cfm?art=2549">http://www.bioedonline.org/news/news.cfm?art=2549</a> At least a summary of the actual study can be found at <a href="http://www.asm.org/Media/index.asp?bid=42940">http://www.asm.org/Media/index.asp?bid=42940</a> The key facts stating "Clean pieces of wet suit material were exposed separately to sea water suspensions of these bacteria." Meaning they were dipped into containers full of cultured bacteria, nothing related to divers swimming in the ocean. Also brought up again on page 38.	
Fish Feeding	29		Again, a far fetched hypothesis of barracuda eating food scraps from boats and then attacking divers as they enter the water. First, barracuda eat live fish and cephalopods, not garbage from dive boats. The chance of an injury from a barracuda is so remote in any circumstance, it is not appropriate in this kind of document.	
Mooring buoys	29		Suggest a study to determine impact to any particular mooring buoy area before implementing a program to	

			close sites. Images exist of all mooring sites from the mid 1990s, just a few years after installation. Same statement on page 36.	
Water	32	Risks to Human health	The claim is made that the mercury in barracuda samples may have come from oil and gas activities. This is pure speculation, contradicts all recent research, and neglects to mention the major sources of mercury in the Gulf, land-based combustion sources. "Natural deposits" are similarly not a significant source. a significant body of research has been done that demonstrates that mercury in fish in the Gulf and around the FGB does NOT come from oil and gas activities in any significant way. <a href="http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html">http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html</a> Need to use the best available science here, good links through the MMS web site above.	
	33	Line 1	These sections get into the repeated and unnecessary waffle words for obvious statements: Discharges from numerous sources "potentially" influence water quality. They are well known to do so. No discharges are the exact equivalent of seawater in chemistry and temperature. Why waffle?	
	33	Bullet 2	The pipeline to HIA389A is bringing in more hydrocarbons. Why waffle on saying it "may result" in increased production. They are processing the additional input and production is increased due to that fact.	
Habitat	39	Last P	With over 50% cover, why say "relatively" healthy? It is the healthiest coral reef system in the western hemisphere. Seems like you don't need to qualify the statement. It is healthy. Relative to what?	
What is condition	34		Waffle again. Monitoring indicates habitats "appear to be" in good condition. Either they are in good condition or they are not. Didn't think monitoring results demonstrated an "appearance" open to speculation. Over 50% live coral does not "appear" to be good condition, it <b>is</b> good condition.	
	35	top	Statement about sediment contaminants should be qualified as being located well away from the coral reef zone on soft bottom below a depth of 120 m. That is why shunting stipulations were developed.	
Human activities	35	Last P	What kind of monitoring of artificial reefs is suggested? There are already artificial reefs all around the FGB as well as one inside the boundaries. Standing platforms are just as much of an artificial reef as a platform laid on its side. Fish aquaculture is likely not going to occur close to the sanctuary. Good water quality is necessary, but so is a reasonable water depth to anchor net pens etc. This sounds like an unsupported	

			fear of something that is very unlikely to be an issue.	
	36	Top of page	Including snapper in the list of declining observations is questionable. There have never been observations of abundant red or vermilion snapper on the upper coral reef of the FGB. Vermillion snapper are common at Stetson, but very sporadic in their abundance, not in decline. One dog snapper one year and none the next is really not a decline. Perhaps a clarification of the reported decline of large snapper is needed.	
Status of key species	36		Coral populations “appear to be relatively...” Two waffle words in the same sentence! Monitoring results indicate coral populations <b>are</b> stable. Perhaps can say relatively stable, but it is not an “appearance.”  As above, back-up needed for reports of declining snapper.  Similar: Diadema <b>are</b> more abundant at Stetson, don’t need to say relatively more abundant.	
condition	36		Do we not know the coral health is good? Why say it “appears” good?	
Human activity	36		Don’t we know the level of activity? If so, don’t need to say “appear” to be stable.	
Living Resources Table	37		Disagree with just a fair ranking of key species. One would think that the corals are the most significant. They are in nearly pristine condition and in the best condition of most any, if not all other reefs in this hemisphere. Not just fair. The only mentions of any declines are a few fish groups. Snapper are not typical residents on the coral reef. If there are records of a greatly depressed population in deeper parts of the Sanctuary, that is another thing. Jacks and groupers are said to be “declining.” There was a significant difference in abundance of groupers between 2002 and 2003 but species richness of carnivores at the FGB compares similarly with other reefs in the Gulf and Caribbean. Should a single year’s decline of a few fish species cause the entire rating to be lowered from a Good or Good/fair to just Fair? Are groupers the keystone species that will always cause a major adjustment in this ranking?	
Living Resources Table	37		Disagree with the down arrow on health of Key Species. Record for last 5 years does not really support this down arrow. Marginally worse for one year or even two may not warrant a “getting worse” rating. What were results for this year? Seems like a solid trend is necessary to rank “getting worse” that represents the last 5 years and will not be revaluated	

			for another 5 years. If have significant disease for 3 years, OK. Don't think that is the case.	
Aquaculture	37	bottom	Again, a non-issue. Artificial reefs have surrounded the FGB and Stetson for 30 years. Is there really an effort to document species from artificial reefs at the FGB? Sergeant majors were reported in the last monitoring report but there was no discussion that they are an introduced species to the FGB.	
	38	Top page	Common misunderstanding of the requirement. Removal of platform is only required when all activities have ended on the entire lease. Can cease production at one platform, but if other activities continue in that lease block, there is no requirement for removal.	
Unprotected Essential Habitat	38		Recent studies have only highlighted a theory of connectivity. There has been no evidence and any "importance" is a theory until demonstrated. If genetic or other definitive evidence exists, it should be cited.	
Harvesting	39		Curious how "little enforcement" will change with a new 83 ft sanctuary vessel? Is there a plan to be on site for X number of days every month of the year? Would be worth mentioning an enforcement program if one is planned.	
Invasive Species	39		While hard to resist, removing discovered colonies of an invasive species is really wishful thinking. Removal of a few colonies of <i>Tubastrea</i> out of the vast areas of unobserved habitat cannot be effective.	
	40	top	A serious effort to determine the potential impacts of vessel discharges should be made prior to implementation of new highly restrictive regulations. Approved sanitation device and gray water discharges are at the surface. The coral reef habitat is a minimum of 55 deeper. There is almost always a current of some kind. It would be incredible to detect any signature from a dive vessel discharge at any depth below 10 m or more than a few hundred feet from the point of discharge.	
Concluding	40		The FGB outshines <b>most</b> if not all other reefs, not just many. "Most" species do not "appear" to be exploited?? Which species are exploited?	
	41	P 2	Insert clarification: increasing levels of both legal and illegal <b>fish</b> harvesting... I believe this is the intent, not coral or other illegal harvesting.	
References	42	Entry 3	MMS not the author of this pub. It is Continental Shelf Associates.	

## References

Baums, I.B. M.W. Miller and M.E. Hellbridge. 2005. Regionally isolated populations of an imperiled Caribbean coral, *Acropora palmata*. *Molecular Ecology* 14(5):1377-1390.

Boland, G.S. and P.W. Sammarco. 2005. Observations of the antipatharian "black coral" *Plumapathes pennacea* (Pallas, 1766) (Cnidaria: Anthozoa), northwest Gulf of Mexico. *Gulf of Mexico Science* 23: 127-132.

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### **Review 3 of 4:**

As requested, I have reviewed the report "Flower Garden Banks National Marine Sanctuary CONDITION REPORT" . The report is adequate for its purpose, with correct and useful information that should be useful in the NOAA Sanctuaries policy and operation decision process.

There are some format and style difficulties that make the report less than satisfying to read. It has the appearance of a "cut-and-paste" job with the text varying from authoritative to promotional. Care should be taken when using pre-existing text that it is current, not erroneous, incomplete nor repetitive, and that it is up-to date.

As organized, the report is overly repetitive and redundant, and rather fragmented. I found myself reading sentences that I had previously read 2 or 3 times. Worse, I found new information concerning a subject embedded in what would otherwise have been a repetition of a paragraph presented earlier in the report. I suggest that the report be re-organized and focussed in order to consolidate information, reduce the fragmentation and redundancy and, in the process, shorten the text substantially without losing content.

Possibly it could be re-structured to address each of the 17 questions completely in a separate chapter devoted to each. For each question, the authors could address aspects of history, resources, pressures, status and response as they relate specifically to the question, once-and-for-all. These aspects are unique for each question and, therefore, would not necessarily be repeated in any other section of the report.

I have sent you a hard copy of the report with my hand-written comments, many not mentioned above. These include a few recommendations concerning the technical and scientific content, as well as typographical error corrections and style suggestions.

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### **Review 4 of 4:**

In this report, "natural" causes or events "generally are not considered as threats and cannot be managed...Natural events discussed include climate change..." (p . 4). Assertions that changing climatic conditions cannot be managed (p. 4) or controlled (p. 38) are no longer tenable. The U.S. executive branch has acknowledged that human-induced increases in greenhouse gas emissions are contributing to global-scale warming and associated acidification of the world's oceans. The U.S. Coral Reef Task Force has urged its members "to take action to confront the serious challenge of climate change" ([www.coralreef.gov/taskforce/pdf/climate\\_samoa\\_2007.pdf](http://www.coralreef.gov/taskforce/pdf/climate_samoa_2007.pdf)). The National Marine

Sanctuary Program is squandering the opportunity provided by the publication of this series of reports to assume a bold leadership role in motivating the public, policy makers and agencies to begin minimizing our carbon footprints 'for the ocean's sake.' To act otherwise is shirking its responsibility to manage and protect marine areas.

Specifically with regard to the Flower Gardens Banks NMS, increased water temperature is identified as one basis for being concerned about possible declining water quality (WATER, section 1). Yet the human actions that give rise to the current warming are not among the human activities that influence water quality in section 4; had they been listed here, its rating would be expected to have changed from – to ↓. Moreover, there is no mention of any effort to reduce carbon emissions during routine Sanctuary operations or when the new vessel comes online (WATER "Sanctuary Response" section). Equally lacking is a broad-based long-term public outreach campaign comparable to that being started by the Great Barrier Reef Marine Park Authority with the Australian Greenhouse Office (see link at [www.gbrmpa.gov.au/](http://www.gbrmpa.gov.au/)).

Similarly ignored is any possibility that further anthropogenic warming and associated deleterious events (*e.g.*, outbreaks of disease, reduced growth or sexual reproduction) may well degrade the habitat quality of the Flower Garden reefs (HABITAT, section 8), along with the status of its biodiversity, key species and their condition or health (LIVING RESOURCES, sections 9, 12, 13, 14), and might even facilitate the spread of certain invasive alien species (section 11). Addressing climate change effects should also be included in these two Sanctuary Response sections.

Apart from the climatic cop-out, I found this to be a useful summary of conditions and threats. Short captions would enhance the value of the photographs, the photographers need acknowledgment, and the references need checking (I couldn't locate Kraemer, 1982). A copy editor will doubtless catch the occasional spelling and grammatical errors.